

Netopia™ ISDN PC Card

User's Guide for Windows



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For additional copies of this user's guide, order Farallon part number 6120297-00-01.

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Chapter 1

About the Netopia ISDN PC Card

Congratulations on your purchase of the Farallon Netopia™ ISDN PC Card! The Netopia ISDN PC Card provides easy and affordable high-speed Basic Rate ISDN connection to the Internet or to your office local area network (LAN).

Internet access. The Netopia ISDN PC Card allows Internet connections over an ISDN line at speeds of up to 512 kilobits per second. With this speed, it's easier and more cost-effective to access online services or browse the World Wide Web and download high-resolution graphics, video clips, interactive games, or music.

Work-at-home access. The Netopia ISDN PC Card provides the telecommuter with fast access to network resources back at the office. You can access applications such as email, or download data from a remote database, in a fraction of the time it would take with a conventional analog modem.

Ease of use. The Netopia ISDN PC Card can be installed in a notebook computer or any computer equipped with a PC Card (PCMCIA) slot. Advanced PC Card technology emulates the computer's COM port, complementing your communications application without the need for additional device drivers, and providing higher throughput than external serial ISDN devices. Netopia configuration software makes it easy to set up and use the PC Card.

The Netopia ISDN PC Card is available in S/T and U interface versions. The U version offers an integrated-NT1 (Network Termination device) so that no other equipment is required.

Your plug and play ISDN solution. Once your telephone company has installed your ISDN line, you can insert the Netopia ISDN PC Card into your PC Card slot and enter appropriate parameters to configure and use the card. A connection to your office LAN or the Internet can be established over your ISDN line with a remote access client application. You can use client applications that are included with your operating system or supplied by your network administrator or Internet Service Provider.

Up and Running, Guaranteed. Farallon Customer Service offers world class technical support and unique service programs that can help you get connected and stay connected. With our *Up & Running, Guaranteed!* program for North America, Farallon will provision your ISDN line and help you configure your PC Card. See the Technical Support section at the back of this user's guide for contact information.

Netopia ISDN PC Card requirements. To use the Netopia ISDN PC Card, you will need the following:

- ISDN Basic Rate line installed by your telephone company (For more information about ordering ISDN in North America, see the README.TXT file on Netopia ISDN PC Card Disk 1, or look into Farallon's *Up & Running, Guaranteed!* program.)
- A Type II PC Card slot in your computer
- One of the following operating systems: Windows 95, Windows NT (version 4.0 or 3.51), Windows 3.x, or DOS (DOS requires a VT100-compatible terminal emulation program)
- Remote access client software (supplied as part of your operating system, or by your network administrator or Internet Service Provider)

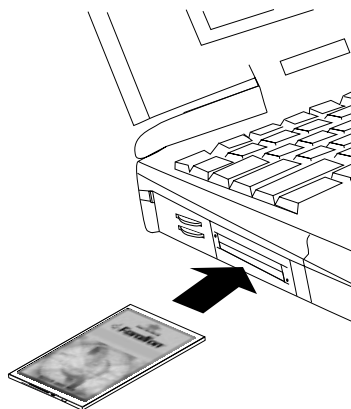
Chapter 2

Installation

This chapter covers the three basic steps for installing your Netopia ISDN PC Card: (1) inserting the PC Card into your computer's slot; (2) connecting your equipment; and (3) configuring the PC Card.

STEP 1: INSERTING THE PC CARD

Hold the Netopia ISDN PC Card with the colored label facing up and the arrow pointing toward the PC Card slot on your computer. Slide the PC Card into the slot until it is firmly seated.



Inserting the Netopia ISDN PC Card

STEP 2: CONNECTING YOUR EQUIPMENT

Depending on the product you purchased, the Netopia ISDN PC Card with U interface or the Netopia ISDN PC Card with S/T interface, the appropriate equipment is provided. Your geographical location typically dictates the ISDN interface type to use. The following table summarizes the interface and equipment used by geographical region:

Region	Interface	Provided Equipment
North America	U interface	Integrated-NT1 (ISDN U interface connector) and RJ-45 to RJ-45 cable
Outside North America (except Australia)	S/T interface	ISDN S/T interface connector and RJ-45 to RJ-45 cable
Australia	S/T interface	ISDN S/T interface connector, RJ-45 to RJ-45 cable, and terminating resistor

U INTERFACE

The U interface is used in North America where an external NT1 is required to make an ISDN connection. Plug the RJ-45 cable into your ISDN wall jack. Then connect the cable to the RJ-45 port on the U interface connector.



Connecting the U interface connector and RJ-45 cable

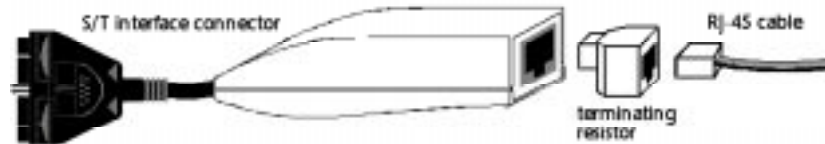
S/T INTERFACE

Outside of North America, ISDN connections are made using the S/T interface. Plug the RJ-45 cable into your ISDN wall jack. Then connect the cable to the RJ-45 port on the S/T interface connector.



Connecting the S/T interface connector and RJ-45 cable

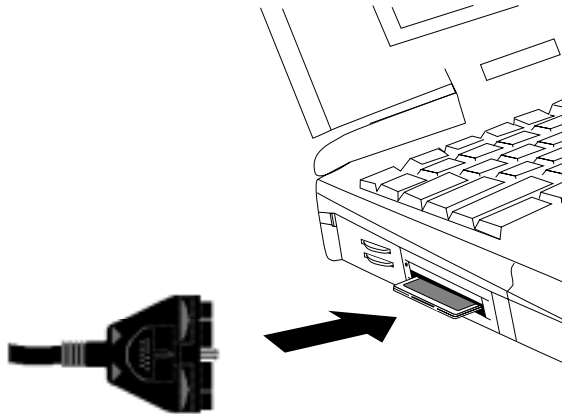
In Australia, a different S/T interface is used, and a terminating resistor may be required. The illustration below shows how the Australian ISDN S/T interface connector, the terminating resistor, and the RJ-45 cable connect together. For more information about terminating resistors, see the README.TXT file on the Netopia ISDN PC Card Disk 1.



Connecting the S/T interface connector, terminating resistor, and RJ-45 cable

CONNECTING YOUR INTERFACE TO THE PC CARD

To connect your interface to the PC Card, position the connector with the embossed arrows toward the card. Push it straight into the port on the card. Then push the locking tab on the connector toward your computer.



Attaching the interface connector to the PC Card

STEP 3: CONFIGURING THE PC CARD

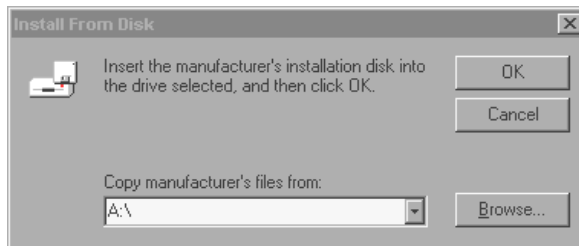
To configure the Netopia ISDN PC Card for your computer, refer to the section below which corresponds to your platform.

WINDOWS 95

1. The first time you insert the Netopia ISDN PC Card, the New Hardware Found screen appears:



2. Be sure that "Driver from disk provided by hardware manufacturer" is selected, and click OK. The Install From Disk screen appears:



3. Insert the Netopia ISDN PC Card Disk 1, then click OK.
4. Go to Chapter 3, "Windows Configuration Tool," and continue from there.

WINDOWS NT 4.0

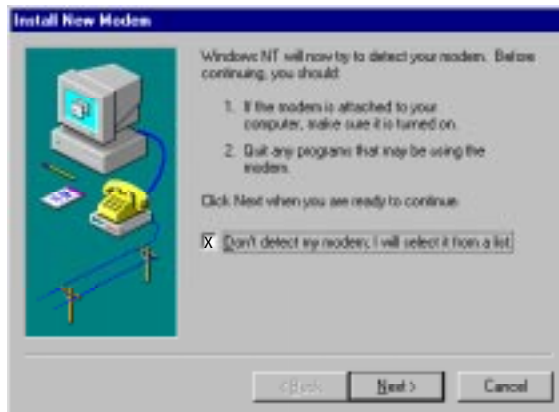
1. Open the Control Panel and select Modems.



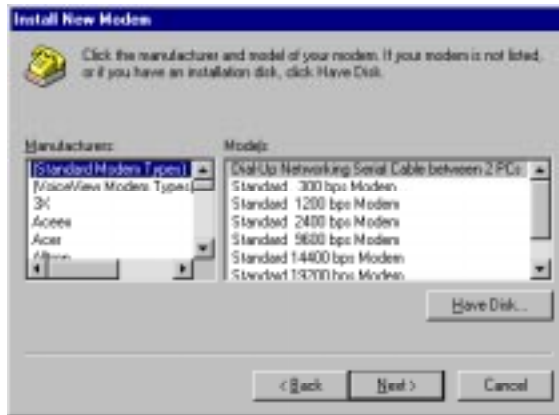
2. Click Add in the Modems Properties screen.



3. Select "Don't detect my modem", then click Next.



4. Select Have Disk.

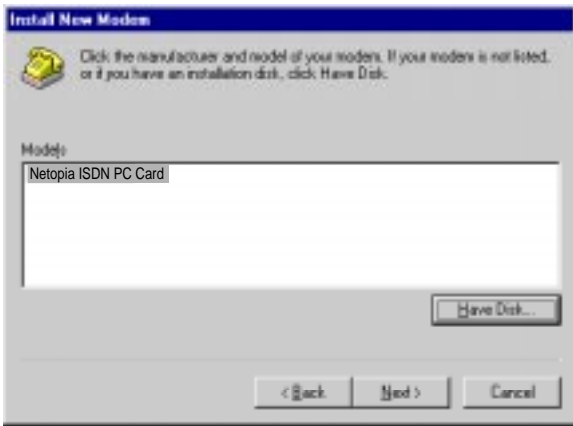


5. Insert Netopia ISDN PC Card Disk 1, then click OK.

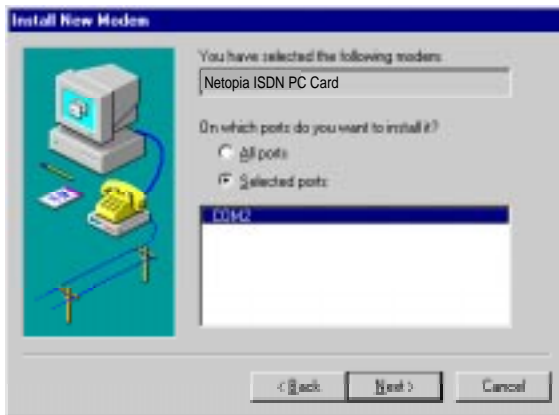


The Netopia .INF file will be installed.

6. The Netopia ISDN PC Card will be detected. Select Netopia ISDN PC Card, then click Next.



7. Select COM Port, then click Next.



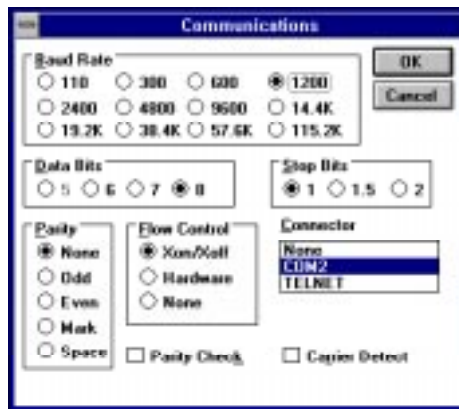
8. Click Finish.
9. Go to Chapter 3, "Windows Configuration Tool," and continue from there.

WINDOWS NT 3.51

1. Open the Accessories and select Terminal.



2. From the Settings menu, select Communications, and the following screen will appear:



3. Select a COM port from the Connector list and click OK.
4. Type the following command:

ATI8

If the response "Farallon Communications, Inc. Netopia ISDN PC Card" is returned, then the correct COM port for the Netopia ISDN PC Card has been selected.

If no response is returned, repeat steps 3 and 4 with another COM port until "Farallon Communications, Inc. Netopia ISDN PC Card" is returned.

5. Go to Chapter 3, "Windows Configuration Tool," and continue from there.

WINDOWS 3.X AND DOS

1. Make sure that a Card Services software is installed on your computer. This section uses CardSoft as an example, so the commands you enter may differ from those used here. Refer to your vendor's documentation for the correct commands, if needed.
2. Enter the following command at the prompt:

```
C:\CARDINFO
```

If the Netopia ISDN PC Card is detected, the following message is returned:

```
Slot 0:  
Card Type = Modem (COM2)  
Manufacturer = Farallon Communications, Inc.  
Product Name = Netopia ISDN PC Card
```

```
Slot 1:  
Slot 1 is empty
```

3. Enter the following command at the prompt:

```
C:\TELEX
```
4. Press Alt+P to open the Port Configuration screen. Configure the COM port that was returned when the Netopia ISDN PC Card was detected. Set the Speed to 115200, then press Enter to save your changes and exit the screen.
5. Go to Chapter 4, "VT100 Configuration Tool," and continue from there.

Chapter 3

Windows Configuration Tool

For Windows 95, Windows NT 4.0, and Windows NT 3.51, the Netopia ISDN PC Card Windows Configuration Tool provides an easy-to-use interface for completing your PC Card configuration. The Windows Configuration Tool allows you to view the PC Card version and firmware properties, configure dialing and communication information, and download updated versions of the firmware. This chapter covers how to install and run the Windows Configuration Tool. The first step is to use the Setup Wizard.

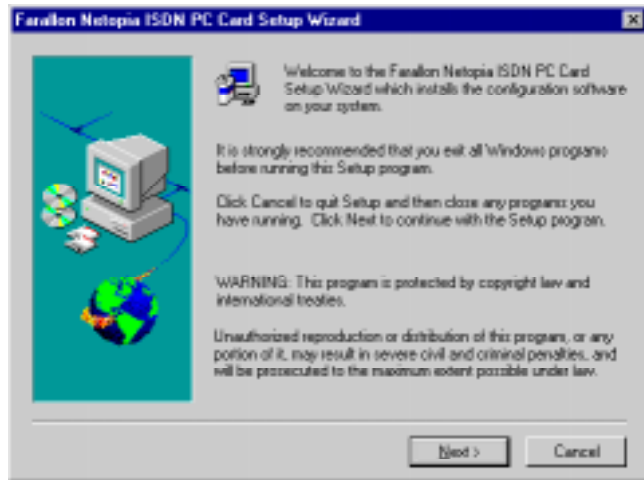
USING THE SETUP WIZARD

The Setup Wizard provides an easy method of installing the Windows Configuration Tool and all the program files used by the Netopia ISDN PC Card. To use the Setup Wizard, follow the steps below.

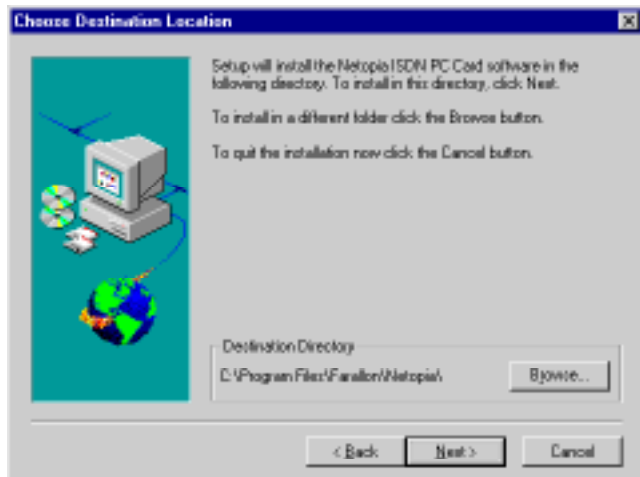
1. Insert the Netopia ISDN PC Card Disk 1 and type the following in the Run applet from the Start menu or File menu:

A: \SETUP

2. Click Next in the window that appears:

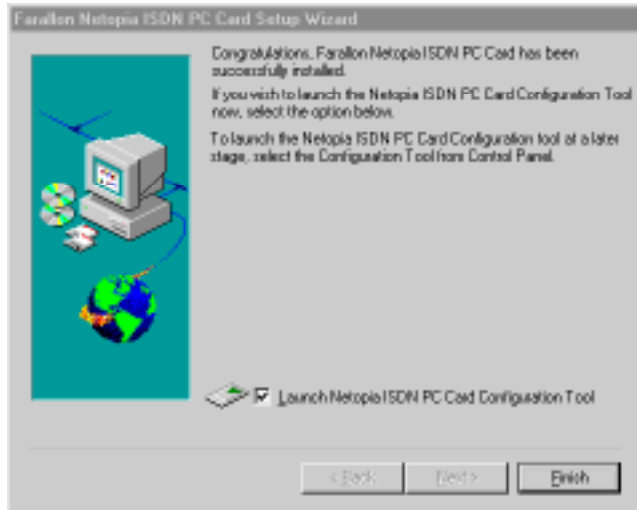


3. Specify where the Netopia ISDN PC Card software is to be installed.



4. Click Next. The Setup Wizard will install all files and create a Netopia ISDN PC Card program directory. Follow the on-screen instructions for inserting the other disks.

5. When the window below appears on your screen, click Finish.



6. The Netopia ISDN PC Card Configuration Tool launches and the Properties window appears:



7. Complete your PC Card configuration by continuing with the "Profile Configuration" section on the next page.

PROFILE CONFIGURATION

Netopia ISDN PC Card configuration settings are saved into profiles. Your Netopia ISDN PC Card is already equipped with a factory profile which requires only your ISDN information to establish a connection. Using the factory profile as a basis, you can create your own profile. Up to three user-defined profiles can be created for different connection scenarios, but only one profile may be active at one time.


To configure a profile, follow the steps below.

1. In the Netopia ISDN PC Card Properties screen, click Profile Properties. The Profiles window appears:



2. Select a profile from the list, then click Configure Profile.
3. The Profile Configuration window appears. The North American and International firmware versions each have their own screen. If your current geographic location differs from the firmware loaded in your Netopia ISDN PC Card, refer to the "Updating firmware" section later in this chapter.

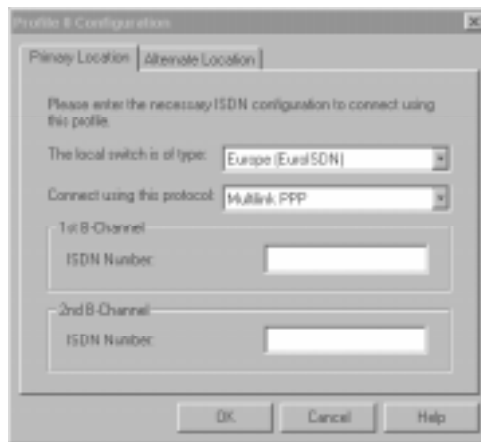
- North American Profile Configuration window:



The screenshot shows the 'Profile 8 Configuration' dialog box. It has two tabs: 'Primary Location' and 'Alternate Location'. The 'Primary Location' tab is active. The dialog contains the following fields and options:

- Text: 'Please enter the necessary ISDN configuration to connect using this profile.'
- Dropdown: 'The local switch is of type:' with 'North America (Auto Detect)' selected.
- Dropdown: 'Connect using this protocol:' with 'Multilink PPP' selected.
- Section: '1st B-Channel' containing:
 - Text input: 'ISDN Number'
 - Text input: 'Service Profile Identifier (SPID)'
- Section: '2nd B-Channel' containing:
 - Text input: 'ISDN Number'
 - Text input: 'Service Profile Identifier (SPID)'
- Buttons: 'OK', 'Cancel', and 'Help' at the bottom.

- International Profile Configuration window:



The screenshot shows the 'Profile 8 Configuration' dialog box, similar to the one above but for an international profile. The 'Primary Location' tab is active. The fields and options are:

- Text: 'Please enter the necessary ISDN configuration to connect using this profile.'
- Dropdown: 'The local switch is of type:' with 'Europe (EuroISDN)' selected.
- Dropdown: 'Connect using this protocol:' with 'Multilink PPP' selected.
- Section: '1st B-Channel' containing:
 - Text input: 'ISDN Number'
 - Text input: 'Service Profile Identifier (SPID)'
- Section: '2nd B-Channel' containing:
 - Text input: 'ISDN Number'
 - Text input: 'Service Profile Identifier (SPID)'
- Buttons: 'OK', 'Cancel', and 'Help' at the bottom.

A profile holds the phone numbers for up to two locations, with one being designated as the Primary Location, and the other as the Alternate Location. It makes no difference which number is specified where, as the Netopia ISDN PC Card automatically calls the other number should the first call not be completed.

4. For either the Primary or Alternate Location, the following parameters must be configured:

Parameter	Description
The local switch is of type:	Specifies the ISDN switch type used by your ISDN service provider. North American firmware: For most locations, the default of North America (Auto-Detect) should be used. If the ISDN Switch Type cannot be automatically detected, National ISDN-1 (NI-1) or AT&T (5ESS) can be explicitly specified. International (Excl. North America) firmware: Europe (EuroISDN), Japan (INS-Net64), and Australia (TPH1962).
Connect using this protocol:	Specifies the B-channel protocol to be used, and must match the protocol on the receiving system. For most connections, the default of Multilink PPP should be used. If the default is not supported, PPP for single B-channel connections and V.120 are also available.
ISDN Number (1st/2nd B-channel)	Specifies your ISDN number.
Service Profile Identifier (1st/2nd B-channel)	North America only. A number specified by your ISDN provider which identifies your ISDN equipment to the switch (may be optional with 5ESS).

Note: Communications using PPP or V.120 only use a single B-channel, whereas Multilink PPP connections require the configuration of a second B-channel.

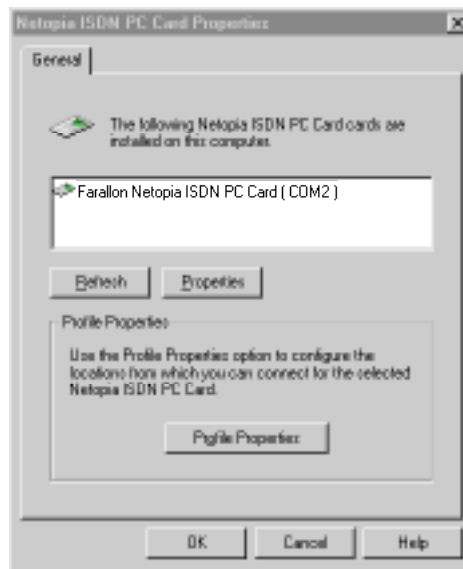
5. Click OK to close the Profile Configuration window.
6. In the lower half of the Profiles window, select one of the profiles to be your default profile. The default profile is automatically loaded upon startup of the Netopia ISDN PC Card.
7. Once you have specified the default profile, click OK to close the Profiles window.
8. Click OK to close the Properties window and load the configuration.

You are now ready to use your Netopia ISDN PC Card. Refer to Chapter 5, "Operation," for instructions on making a connection.

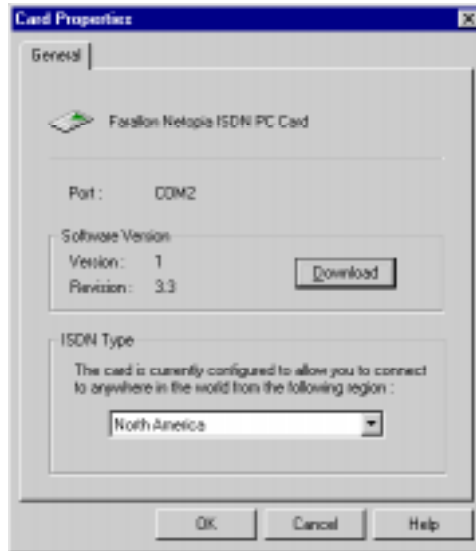
UPDATING FIRMWARE

This section tells you how to load firmware into your PC Card's ROM. You may need to do this in order to use your PC Card in a different geographical region, or simply to update your PC Card with new firmware versions. To download firmware into your PC Card, follow the steps below.

1. Open the Netopia ISDN PC Card Configuration Tool and click "Farallon Netopia ISDN PC Card" to select it.



2. Click the Properties button. The Card Properties screen appears:



3. Perform one of the following:

To download:	Follow these steps:
Different regional firmware	<ol style="list-style-type: none"> a. Select your geographic location within the ISDN Type field. b. Confirm your firmware change by clicking Yes in the Configuration Tool's prompt window.
New firmware version	<ol style="list-style-type: none"> a. Click Download to access the Download dialog box. b. Use Browse to navigate to the new firmware file from Farallon and click Open. c. Select either ROMØNA.ELM for North America or ROMØROW.ELM for International, then click Download.

Chapter 4

VT100 Configuration Tool

For Windows 3.x and DOS, the Netopia ISDN PC Card VT100 Configuration Tool provides a quick and easy way to complete your PC Card configuration. The VT100 Configuration Tool is built into the Netopia ISDN PC Card firmware and lets you configure basic ISDN-specific parameters. It is also available as an alternative to the Windows Configuration Tool.

VT100 CONFIGURATION TOOL ACTIVATION

1. Start your VT100-compatible terminal emulation program. Use the table below as a guideline for setting up your terminal emulation program:

Parameter	Setting	Parameter	Setting
CR-CR/LF Inbound	No	Translation	No
CR-CR/LF Outbound	No	Scroll Bars	No
Local Echo	No	Use Arrow Function	No
Terminal Font	Terminal		

2. Verify that the terminal emulation program uses the same COM port that the Netopia ISDN PC Card is emulating.
3. Enter the following command at the prompt and press Enter:

AT@MENU

The main VT100 Configuration Tool screen appears:

```

*-----*
*                               Netopia ISDN PC Card - North American Version 1.3
*-----*
MENU: Main menu
      Open Profile: Current profile
Prim. ISDN Param.: >
Alt. ISDN Param.: >
  ISDN Numbers: >
    Protocol: U.120
Powerup Profile: Profile 0
Save Profile: Profile 0
Restart Card: Profile 0
  Quit
<ESC> Exit
                                     -HELP-
Selects which profile to open: current, stored (0,1,2) or factory.
-Loads the current profile.
*-----*

```

VT100 CONFIGURATION TOOL SCREEN NAVIGATION

The following table lists the keys used to move within the VT100 Configuration Tool screens:

Key	Description
Up arrow	Moves the cursor to the previous field.
Down arrow	Moves the cursor to the next field.
Right arrow	Moves to the sub-menu level. For a text field, moves the cursor one character to the right.
Left arrow	Moves to the previous menu level. For a text field, moves the cursor one character to the left.
Enter	Validates the configured setting and moves to the next field. Also moves to the next menu.
Tab	Moves to the next field.

Key	Description
Space bar	For fields with multiple choices. Displays the next choice available for the field.
F2	Moves to a desired menu. Press the appropriate letter key (indicated by underline) corresponding to the menu you want to access.
ESC	Cancels your configuration setting if a change was made. If no change was made, moves to the previous menu level.

4. Select the B-channel protocol to be used. The protocol you select must match the protocol on the receiving system.

Note: Communications using PPP or V.120 only use a single B-channel, whereas Multilink PPP connections require the configuration of a second B-channel.

5. Complete your PC Card configuration by continuing with the "Profile Configuration" section below.

PROFILE CONFIGURATION

Netopia ISDN PC Card configuration settings are saved into profiles. Your Netopia ISDN PC Card is already equipped with a factory profile which requires only your ISDN information to establish a connection. Using the factory profile as a basis, you can create your own profile. Up to three user-defined profiles can be created for different connection scenarios, but only one profile may be active at one time.

Within each profile, enter the phone numbers for up to two locations, with one being designated as the Primary Location, and the other as the Alternate Location. It makes no difference which number is specified where, as the Netopia ISDN PC Card automatically calls the other number should the first call not be completed.

Once the profiles have been configured, you must specify which profile is to become the default profile. The default profile is automatically loaded upon startup of the Netopia ISDN PC Card.

To configure a profile, open the VT100 Configuration Tool and follow the steps below.

1. From Open Profile in the Main Menu, select the profile to be configured from the scroll-down list.
2. Select Primary or Alternate ISDN Parameters and press Enter to open its configuration screen.

3. For either the Primary or Alternate Location, the following parameters must be configured:

Parameter	Description
The local switch is of type:	Specifies the ISDN switch type used by your ISDN service provider. North American firmware: For most locations, the default of North America (Auto-Detect) should be used. If the ISDN Switch Type cannot be automatically detected, National ISDN-1 (NI-1) or AT&T (5ESS) can be explicitly specified. International (Excl. North America) firmware: Europe (EuroISDN), Japan (INS-Net64), and Australia (TPH1962).
SPID (Service Profile Identifier) (1st/2nd B-channel)	North America only. A number specified by your ISDN provider which identifies your ISDN equipment to the switch (may be optional with 5ESS).
Subaddress (1st/2nd B-channel)	International only. Specifies your ISDN number and subaddress.

Once complete, press Escape to exit the ISDN Parameters menu.

4. From the Main Menu, select Save Profile and press Enter to save the changes made to the profile.
5. Select Restart Card. Verify that the correct startup profile is specified, then press Enter.

You are now ready to use your Netopia ISDN PC Card. Refer to Chapter 5, "Operation," for instructions on making a connection.

Chapter 5

Operation

Once you have installed and configured your Netopia ISDN PC Card, you are ready to dial into your office or to the Internet.



Computers with the Netopia ISDN PC Card connecting to private LANs and to the Internet

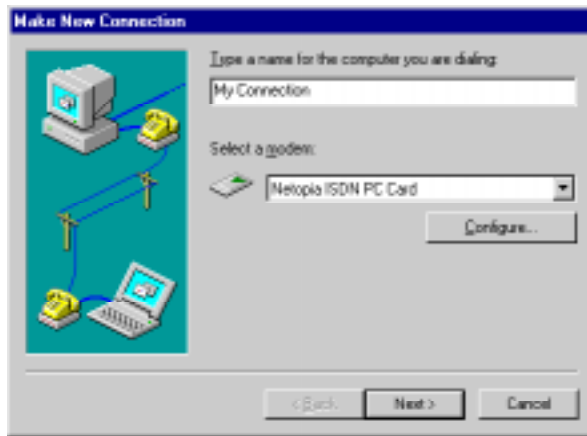
Before proceeding, be sure you have remote access client software, such as Microsoft Dial-Up Networking, or the Shiva PPP or Microsoft RAS client software.

MAKING A CONNECTION

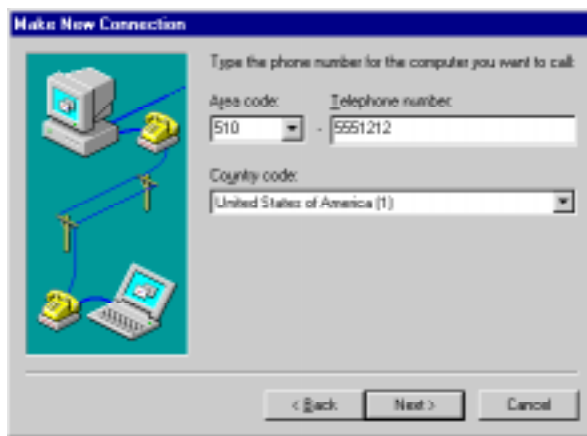
Refer to the section below that corresponds to your platform and perform the steps which follow.

WINDOWS 95

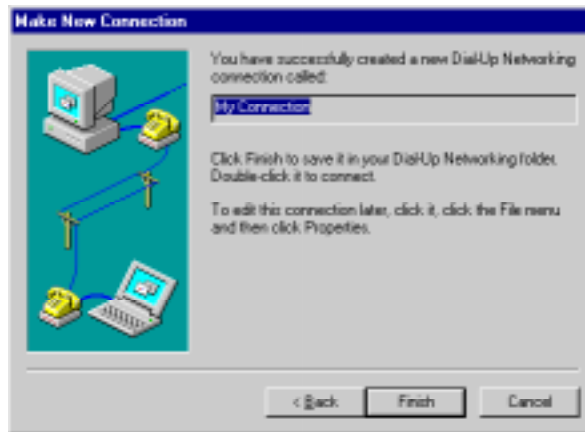
1. Open Dial-Up Networking.
2. Click Make New Connection. The Make New Connection Wizard appears:



3. Select the Netopia ISDN PC Card, then click Next.
4. Enter the telephone number and country code of the location you wish to call, then click Next.



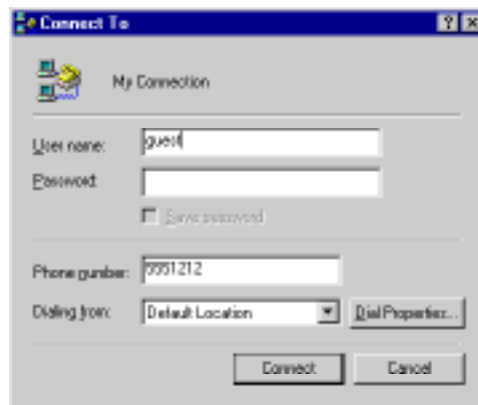
5. Click Finish.



6. In the Dial-Up Networking window, double-click My Connection.



7. Enter your user name and password, then click Connect.

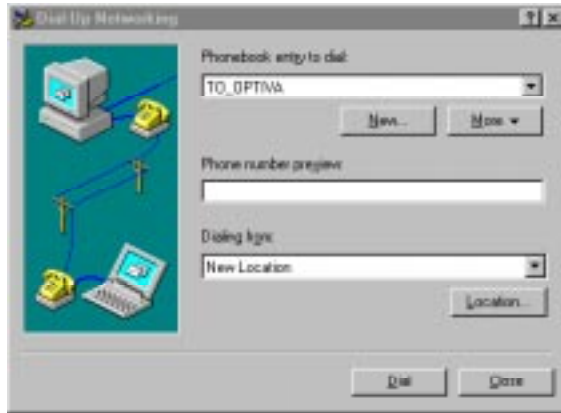


8. If the connection was successfully completed, you can communicate with the remote host.

If the connection could not be established, verify your Server Type and TCP/IP settings and alter them as required.

WINDOWS NT 4.0

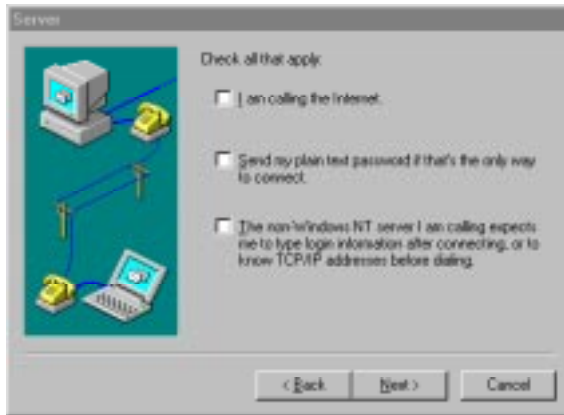
1. Open Dial-Up Networking.



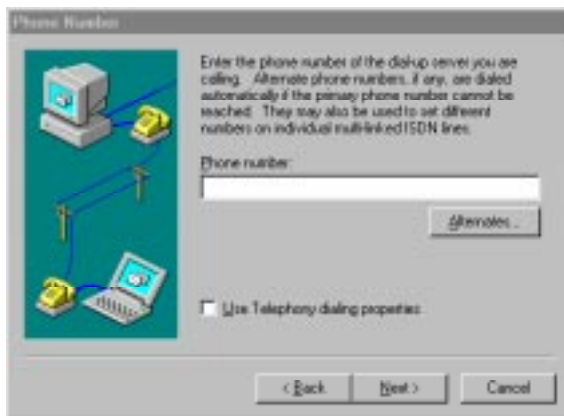
2. Click New. The New Phonebook Entry Wizard appears.



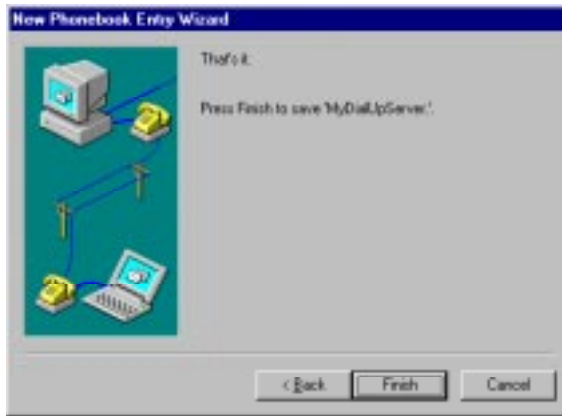
3. Click Next. The Server window appears:



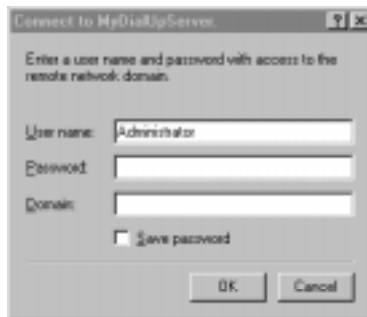
4. Check all the statements that apply, then click Next. The Phone Number window appears:



5. Enter the phone number of the location you are calling, then click Next.



6. Click Finish. This takes you back to the Dial-Up Networking window.
7. Click Dial.



8. Enter your user name and password, then click OK.
9. If the connection was successfully completed, you can communicate with the remote host.

If the connection could not be established, verify your configuration and TCP/IP settings, and alter them as required.

WINDOWS NT 3.51

For RAS connections, open the WFWNTEIC.INF file from the Netopia ISDN PC Card Disk with a text editor and add the entire contents to your system's MODEM.INF file. Save this file and restart your computer for the changes to take effect.

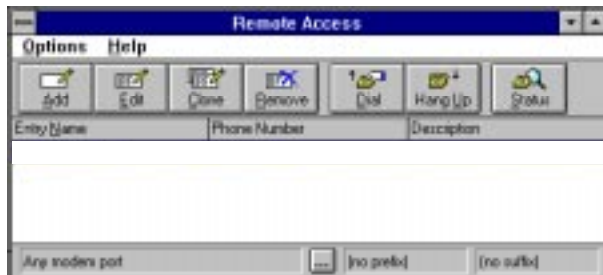
1. In the Program Manager, double-click Remote Access Service.



2. Double-click Remote Access.



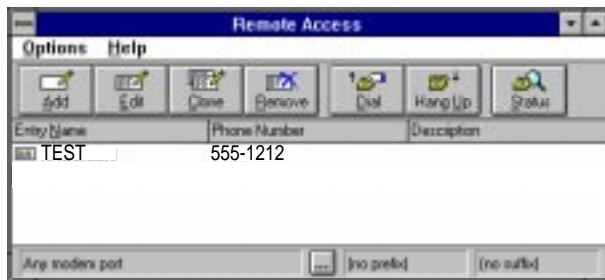
3. In the Remote Access window, click Add.



4. Enter the name and phone number of the location you are calling, then click OK.



5. Click Dial.



6. Enter your user name and password, then click OK.



7. If the connection was successfully completed, you can communicate with the remote host.

If the connection could not be established, verify your configuration and TCP/IP settings, and alter them as required.

WINDOWS 3.X

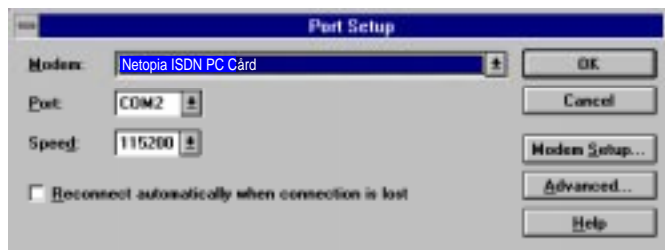
1. Ensure that ShivaRemote connectivity software has been installed on your computer.
2. Click ShivaRemote Connect.



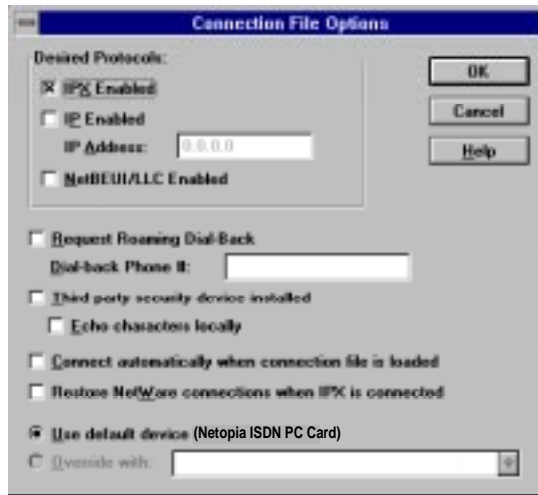
3. Enter your dial-in name, password, and the phone number to be dialed.



4. Click Port Setup from the Tools menu. Select Netopia ISDN PC Card as the modem, then click OK.



5. In the ShivaRemote Connect window, click Options.
6. Enable at least one of the Desired Protocols (e.g., IPX or IP), then click OK.

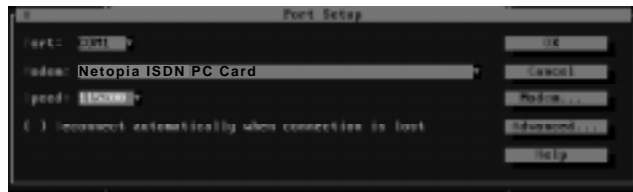


7. In the ShivaRemote Connect window, click Connect.
8. If the connection was successfully completed, you can communicate with the remote host.

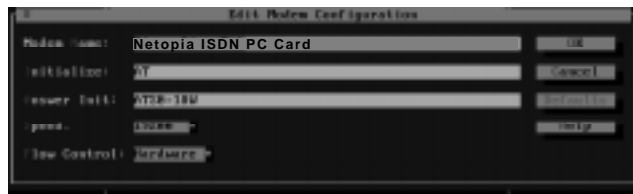
If the connection could not be established, verify your configuration and TCP/IP settings, and alter them as required.

DOS

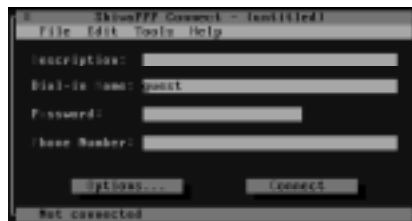
1. Ensure that ShivaRemote connectivity software has been installed on your computer.
2. Enter the following command:
`C:\SHIVA\CONNECT`
3. Select Port Setup from the Tools menu, then select the COM port.



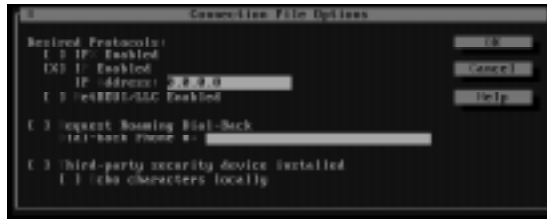
4. Select Modem. You need to create a modem profile. Enter Netopia ISDN PC Card as the modem and set the speed to 115200 bps, then select OK.



5. In the Connect screen, select Options.



6. Enable at least one of the Desired Protocols (e.g., IP or IPX), then select OK.



7. Back in the Connect screen, enter your user name, password, and the phone number to be dialed, then select Connect.



8. If the connection was successfully completed, you can communicate with the remote host.

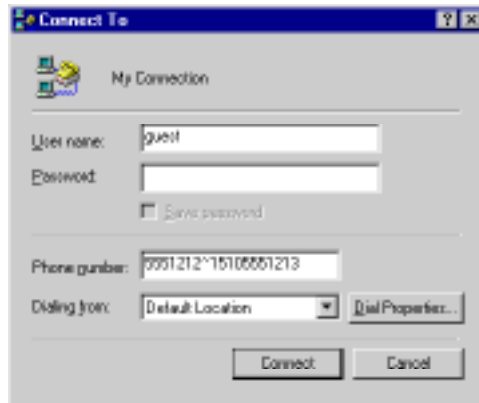
If the connection could not be established, verify your configuration and TCP/IP settings, and alter them as required.

DIALING WITH MULTILINK PPP

If you intend to establish a Multilink PPP connection, contact your Information Services department or Internet Service Provider to ascertain whether you will need one or two remote numbers to properly set up both B-channels.

To establish a Multilink PPP connection, each B-channel requires a remote directory number to connect to. Depending upon your ISDN implementation, the two numbers may differ, or be identical. If the numbers differ, the "~" or "&" character must be used to separate the numerical strings on the dial line. Otherwise, only a single number is input to connect both B-channels.

For Windows 95 and Windows NT 4.0 only. When making long-distance calls, the Country Code, Area Code, and PBX Prefix (if required) must be included in the dialing string for the second B-channel. For example, to make a Multilink PPP connection to the numbers 1-510-555-1212 and 1-510-555-1213 respectively, the dialing string would be entered as follows:



ABOUT PPP AUTHENTICATION PROTOCOLS

The Point-to-Point protocol (PPP), when used with Dial-Up Networking or other PPP client applications, allows for authentication of users dialing into PPP servers. While the connection between a client and server is being established, the server may request authentication: typically Password Authentication Protocol (PAP) or Challenge Handshake Authentication Protocol (CHAP). PAP verifies the user's plain text ID and password. CHAP is a stronger authentication method. It uses encryption and may repeatedly verify the user's ID any time during the connection.

In response to the server's request, the client indicates whether or not it supports the same type of authentication. If it does not support the same type of authentication, it may request an alternative type of authentication. (For example, if the server requests CHAP, but the client only supports PAP, the client will request PAP.) After establishing a type of authentication, the process of verifying the user begins.

Both PAP and CHAP are supported by the Netopia ISDN PC Card.

USING OTHER COMMUNICATIONS APPLICATIONS

Your Netopia ISDN PC Card works with any standard communications application that uses AT commands. When configuring your application, select the Netopia ISDN PC Card, if it is listed. If no special setting is available for Netopia, select a Hayes-compatible modem configuration, such as "generic modem". Refer to your communications software documentation for more details.

DIALING WITH AT COMMANDS

Communications applications communicate with the Netopia ISDN PC Card using standard AT commands. When you place a call from your computer, the Netopia ISDN PC Card recognizes the AT command ATD to dial a digital ISDN data call. Correct examples of outgoing circuit-switched ISDN modem commands with dial strings are shown below.

- Dialing with spaces: AT D 1 800 555 1212
- Dialing without spaces: ATD18005551212
- Dialing with a 56 kbps line: ATDi18005551212
(Your telephone company will tell you if you have a 56 kbps line.)
- Dialing with Multilink PPP: ATD18005551212~18005551212

Note: In North America, most areas require you to dial ISDN calls with 11 digits (for example, 1-800-555-1212), even for local calls.

DATA COMPRESSION

Data compression is a process where the effective throughput is increased by encoding data in such a way that fewer bits are required to represent it. Popular compression algorithms typically reduce the size of the data by half, effectively doubling the rate at which it is transmitted. And with four-to-one compression, the data rate may quadruple.

No configuration is required to enable the Netopia ISDN PC Card's compression functionality. Compression algorithms currently supported by the Netopia ISDN PC Card include LZS (STAC) and MPPC (Microsoft). If the system to which you are connecting supports one of these algorithms, it will automatically be used.

NETOPIA ISDN PC CARD LEDs

Some of the Netopia ISDN PC Card interface connectors have LED indicators that provide an instant status view. These indicators show the status of the connection to the remote device (B-channel) and the status of the link to the ISDN switch (D-channel). The following table lists the LED states and their meanings:

LED B	LED D	Description
Off	Off	The ISDN line is not activated.
Off	Blinking	The ISDN line is activated but not yet operational.
Off	On	The ISDN line is activated and operational, but the port is not connected.
Blinking	On	Attempting a connection with a remote device.
On	On	Connection established with either Multilink PPP, PPP, or V.120.
On	Blinking	A Multilink PPP connection was attempted, but only a single-link PPP connection has been established.
Blinking	Blinking	Indicates a problem.

Chapter 6

Troubleshooting

This chapter provides information on troubleshooting problems that may arise while you are using your Netopia ISDN PC Card. Many factors may cause a communications problem: your device, the cables, the telephone line, the remote device, or the Netopia ISDN PC Card itself.

To isolate the problem, consider the following:

- Was anything changed recently in the configuration or setup that may have affected the Netopia ISDN PC Card's functionality?
- Does the problem occur when you attempt to connect to a remote device for the first time?
- Is this a consistent problem that you can duplicate easily?

Before you call Farallon Technical Support for assistance, you may want to check the following:

1. Verify that the ISDN cable is plugged into the ISDN interface connector, and make sure it is also plugged into the ISDN wall jack. The Netopia ISDN PC Card will not operate if connected to an analog telephone wall jack.
2. Monitor the status of the LEDs. See the section on LEDs in Chapter 5 for information on proper LED functionality.

Depending upon the location you are dialing, there may be an incompatible local or toll telephone company. Though this is uncommon, if you suspect a telephone company problem when dialing local or toll data connections, contact your local telephone company and have it verify that you can dial a data call to the destination telephone number.

3. Make sure that the local and remote data applications have communication capability and are properly configured. Once you have verified that communication capability exists, make sure that the B-channel call data rate is the same as the remote destination B-channel call data rate.

If you are able to establish a data connection (in which the B-channel LED remains lit and your communications application receives a CONNECT message), but you are unable to send data, then it is possible that:

- There is a difference in the local and remote B-channel data rates. Check with your telephone company.
 - There is a mismatch in the data communications protocols (such as V.120 versus PPP). Check with your network administrator or Internet Service Provider (ISP).
 - There is an interoperability mismatch between the local and remote applications. Check with your network administrator or ISP.
4. From a terminal emulation program, use the AT>VD command to test your ISDN connection. If your client software cannot establish a call, you may be able to use the CCIT cause codes returned by the ISDN switch to identify certain problems. Look for the line that reads "- last call attempt: CCITT failure cause = 0x10". You can interpret the code as follows:
 - 0x01 - Unallocated/Unassigned Number. While the number is in a valid format it is not currently assigned. This may be an indication that you have a wrong number. You may also get this code if you try to establish an ISDN connection using only a seven-digit phone number when the full eleven digits are required. Check with your telephone company to see how many digits to use. Also, see code 0x58 below.

- **0x10 - Normal Call Clearing.** As far as the ISDN network is concerned, the call completed normally, but one of the two devices chose to hang up and the other device acknowledged it. You would get this code if your client software was able to connect to the server device, but some element of the configuration, such as the user name or password, was incorrect.
- **0x11 - User Busy.** The device connected to the number dialed is not able to accept an additional connection. If this happens consistently call your ISP or network administrator and ask about other possible numbers to connect through.
- **0x12 - No User Responding.** There was no answer. If this happens consistently, call your ISP or network administrator and verify that the answering device is ready to receive calls.
- **0x22 - No Circuit/Channel Available.** There is no circuit or channel available to handle the call; the ISDN network itself is busy. If you get this code consistently you should contact your telephone company.
- **0x29 - Temporary Failure.** The ISDN network is not functioning correctly but the condition is not likely to last long. You should try the call again. If you get this cause consistently you should contact your telephone company.
- **0x2A - Switching Equipment Congestion.** The ISDN network may be experiencing a period of high traffic and cannot place your call. You should try the call again, and if you get this cause consistently you should contact your telephone company.
- **0x41 - Bearer Capability Not Implemented.** This code is commonly received when an ISDN device attempts to establish a connection with an analog line. Verify with your ISP or network administrator that the number you are using is capable of an ISDN connection.
- **0x58 - Incompatible Destination.** You may get this cause if you try to establish an ISDN connection using only a seven-digit phone number when the full eleven digits are required, or vice versa. Check with your telephone com-

pany to see how many digits their switches are expecting for the data rate (i.e., 56 kbps or 64 kbps per B-channel) that you intend to use.

- 0x6F - Protocol Error, Unspecified. This cause is commonly received when trying to dial from a Centrex ISDN line without putting a 9 at the beginning of the number.

SOLUTIONS TO COMMON PROBLEMS

Below are possible solutions for common problems:

THE PC CARD IS NOT RECOGNIZED BY CARD SERVICES.

If your PC Card is not recognized by PC Card Services, a memory conflict may be the cause. Card Services software requires a 4K memory window to read the Card Information Structure (CIS) of the PC Card. Make sure that this window is excluded from your memory manager (EMM386.EXE). To know which window Card Services is using, refer to your Card Services documentation.

THE PC CARD IS NOT CONFIGURED BY CARD SERVICES.

If your PC Card is not automatically configured by PC Card Services, your Card Services Generic Enabler may have been improperly configured. Most Card Services provide Generic Enable that automatically assigns the next available COM Port to the device. The name of the Generic Enable may differ depending on your Card Services provider. For more information, refer to your Card Services documentation.

THE "PORT IN USE" ERROR MESSAGE APPEARS.

The PC Card is using a port that is already being used by another device. Normally, PC Card Services assigns an available COM port for each newly inserted device and maintains a list of COM ports in use. To solve this problem, use PC Card Services to assign an available port to your PC Card.

THE "COM PORT IS EITHER IN USE OR UNAVAILABLE" OR "PORT NOT OPEN" ERROR MESSAGE APPEARS.

An incorrect Interrupt Request Line (IRQ) may be assigned to the COM port. Most computers have pre-assigned an IRQ# to each COM#. These include the following:

- COM1 and IRQ4
- COM2 and IRQ3
- COM3 and IRQ4
- COM4 and IRQ3

If PC Card Services has assigned different combinations for the COM port and IRQ, you must reassign these numbers accordingly. To reassign your COM port and IRQ, use PC Card Services or the appropriate settings utility for your operating system.

THERE IS A POSSIBLE CONFLICT BETWEEN THE PC CARD AND YOUR SERIAL MOUSE.

Perform the following test:

1. Remove your Netopia ISDN PC Card from your PC Card slot and re-insert it.
2. Activate a terminal emulation program.
3. Enter \$Xmit. Press Enter until the PC Card responds with the following display:

NetopiaCard Xmit test: Enter to start, Enter to stop

4. Press Enter again. The card will continuously transmit this line:

ABCDEFGHIJKLMN OPQRSTUVWXYZ0123456789abcdefghijklmnopq

To check if there is a conflict with the mouse, move the mouse around during the Xmit test. If this causes the transmission to stop or display meaningless characters on your screen, there is probably a conflict, and the mouse driver must be removed or reconfigured to another IRQ.

To stop the Xmit test, press Enter again; the Netopia ISDN PC Card responds with the following:

```
Xmit test terminated
```

Warning: The IRQ may conflict with another COM port and cause the Netopia ISDN PC Card not to respond to a simple \$ test. You may need to remove the mouse driver to diagnose the problem.

YOUR COMPUTER BECOMES LOCKED.

You may have removed the Netopia ISDN PC Card from the PC Card slot while a communications program was running. Close all communications programs before attempting to insert or remove the PC Card.

D-CHANNEL AND B-CHANNEL LEDs FLASHING ALTERNATELY.

This indicates a fatal error on the Netopia ISDN PC Card. You must remove your card and reinsert it into the card slot. If the condition persists, contact Farallon Technical Support.

CARD NOT DETECTED IN WINDOWS 95 OR WINDOWS NT.

After selecting Netopia ISDN PC Card in Modems, type ATIO from a prompt and verify that the string 800-110-0x is returned. Windows 95 does not recognize all 16-bit drivers, and may assign the PC Card to a COM port already in use by an unrecognized driver.

Appendix A

Technical Specifications

NETOPIA ISDN PC CARD FIRMWARE SPECIFICATIONS

Software Feature	Supported on Terminal Adapter
WAN Protocols	<ul style="list-style-type: none"> • PPP (Point-to-Point Protocol) • ISDN (Q.921/Q.931: NI-1, AT&T 5ESS Custom, EuroISDN, TSO13, and NTT JATE) • V.120
PPP Features	<ul style="list-style-type: none"> • PPP async-to-sync conversion • Multilink PPP support
Bandwidth Optimization	<ul style="list-style-type: none"> • Up to 128 kbps • Data Compression
PPP Authentication	<ul style="list-style-type: none"> • Fully compatible with CHAP (Challenge Handshake Authentication Protocol) and MSCHAP • Fully compatible with PAP (Password Authentication Protocol) and SPAP
Management and Configuration	<ul style="list-style-type: none"> • Windows Configuration Tool • VT-100 Configuration Tool • Upgradable Flash memory for firmware
Plug and Play	<ul style="list-style-type: none"> • PCMCIA 2.1

NETOPIA ISDN PC CARD HARDWARE SPECIFICATIONS

Hardware Feature	Supported on Terminal Adapter
WAN Interface	• 1 RJ-45 ISDN U or ISDN S/T BRI
Non-volatile Configuration	• 4 Kbyte non-volatile memory for storing configuration profiles
Operating Temperature	• 32F to 122F (0C to 50C)
Operating Humidity	• 0 to 90% non-condensing
Operating Pressure	• 86 to 106 kPa
Power Requirements	• 200 mA at +5 Volts (+/- 5% maximum variation in power supply)

PC CARD CHARACTERISTICS

The Netopia ISDN PC Card is an active communications card with its own on-board processor that offloads low-level protocol processing tasks from the host computer.

The Netopia ISDN PC Card has the following characteristics:

- Full PC Card support (Type II)
- I/O interface for COM port emulation (full 16550 compatibility)
- Flash memory (for easy firmware upgrade)
- FCC Class B and CE marking compliance
- ANSI/UL, CSA, and JATE compliance

SUPPORTED ISDN SWITCH TYPES

The following table lists the ISDN switch types and corresponding geographical regions supported by the Netopia ISDN PC Card:

ISDN Switch Type	Geographical Region
National ISDN NI-1 and AT&T Custom 5ESS	North America (Canada and United States)
EuroISDN	Europe (including France and Germany)
TS013	Australia
NTT (JATE)	Japan

The Netopia ISDN PC Card includes firmware for both inside and outside of North America. A change in location may require you to update the Netopia ISDN PC Card firmware.

SUPPORTED RATE ADAPTION CONTROLS

The following table lists the rate adaption controls supported by the Netopia ISDN PC Card:

Rate Adaption	Description
Conversion of Asynchronous PPP into Synchronous PPP	This conversion allows for direct point-to-point connectivity.
Asynchronous with V.120 rate adaption	V.120 rate adaption is supported on any asynchronous protocol over ISDN in North America and in any other applicable countries.

REGULATORY NOTICES

REGULATORY INFORMATION FOR THE UNITED STATES

FCC Warning: Changes or modifications to this unit not expressly approved by Farallon Communications could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- This unit requires shielded cables to comply with the FCC Class B emissions limits. Use of unshielded interface cables is prohibited.

REGULATORY INFORMATION FOR CANADA

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.



REGULATORY INFORMATION FOR EUROPE

This equipment displays the CE168 X mark to show that it has been tested and found to fully comply with the Terminal Equipment, EMC and Low Voltage Directives (91/263/EEC, 89/336/EEC and 72/23/EEC, as amended by Directive 93/68/EEC).

REGULATORY INFORMATION FOR FRANCE

This equipment complies fully with the CSE P 10-21 and ETS 300 104 French ISDN delta requirements, as recorded in ITAAB advisory note number 54.

REGULATORY INFORMATION FOR JAPAN

Farallon Communications
 Netopia ISDN PC Card
 JATE approval number: T96-5293-0
 Date of approval: December 25, 1996

SAFETY STATUS: SELV

No voltages within this equipment exceed SELV levels. All interconnection points and ports are SELV.

USER/INSTALLER INSTRUCTIONS FOR THE UNITED KINGDOM

Important Safety Considerations When Installing Into a Host System

- Netopia ISDN PC Card is a PC Card.
- Netopia ISDN PC Card is approved only for installation in an EN60950 approved host and with host attachments which are either type approved for such apparatus, or, if supplied after March 1, 1989, are marked with or supplied with a statement that the host is supplied under: GENERAL APPROVAL NUMBER NS/G/1234/J/100003.
- Netopia ISDN PC Card does not draw power from the ISDN network.

Power Consumption

Check that power supply will not be overloaded. See maximum power requirements. The user must ensure that the total power drawn by the host computer, Netopia ISDN PC Card, and any other peripherals, does not exceed the capability of the host power supply unit.

Proximity to Hazardous Voltages

This information is provided for the benefit of manufacturers of PCs which include a PC Card slot. Users should verify that their PC has been constructed in accordance with the following guidelines.

In order to comply with safety regulations there must be adequate separation between Netopia ISDN PC Card and adjacent modules.

Except at the edge connector which plugs into the host's expansion slot, minimum clearance and creepage distances must be maintained between Netopia ISDN PC Card and other parts of the host, including other installed cards. Clearance is the shortest distance between two points measured directly through the air. Creepage is the shortest distance between the same two points measured along surfaces.

The minimum clearance and creepage distances vary according to the voltage level present in the host PC or in cards installed in it. These figures are listed in the following table.

Voltage used or generated by other parts of the host or expansion card Vrms or Vdc	Clearance mm	Creepage mm
up to 50	2.0	2.4 (3.8)
up to 125	2.6	3.0 (4.8)
up to 250	4.0	5.0 (8.0)
up to 300	4.0	6.4 (10.0)

The creepage distances apply when installed in a normal office environment. The creepage distances shown in parentheses apply where the local environment within the PC is subject to conductive pollution or dry non-conductive pollution which could become conductive due to condensation.

Appendix B

AT Commands

The following table lists the Netopia ISDN PC Card AT commands. Commands marked with an asterisk (*) are configuration settings (static parameters) that do not take effect until the Netopia ISDN PC Card is restarted. The lowercase letters *c*, *n*, *s*, and *v* are variables that take different types of values. Expanded explanations of the AT commands, with default values and parameter ranges, may be found in the README.TXT file on the Netopia ISDN PC Card Disk 1.

AT Command	Description
+++	Escape Sequence
??	Last AT Command Result Explained
A/	Re-execute Previous Command (This command does not require a carriage return.)
AT!C1=n	* Primary ISDN Switch Type
AT!C11=n	* Alternate ISDN Switch Type
AT!C6=n	* ISDN Primary SPID Number (applicable to North America only)
AT!C61=n	* ISDN Alternate SPID Number (applicable to North America only)
AT!C7=n	Primary SPID #2 (for Multilink PPP)
AT!C71=n	Secondary SPID #2 (for Multilink PPP)
AT!E0=n	V.120 N201 Tx (Maximum Transmit Frame Size)
AT!E1=n	V.120 N201 Rx (Maximum Receive Frame Size)
AT!E2=c	V.120 Multiframe Mode
AT!E3=n	V.120 K Window Size
AT!E4=n	V.120 T200 (Retransmission Timer)

AT Command	Description
AT!E5=n	V.120 N200 (Maximum Retry Count)
AT!E6=n	V.120 T203 (Link Integrity Timer)
AT!E7=n	V.120 Idle Timer
AT!N1=n	* ISDN Primary Directory Number
AT!N11=n	* ISDN Alternate Directory Number
AT!N2=n	Primary Directory Number #2 (for Multilink PPP)
AT!N21=n	Secondary Directory Number #2 (for Multilink PPP)
AT!N3=n	* ISDN Primary Subaddress
AT!N31=n	* ISDN Alternate Subaddress
AT!N4=n	Primary Subaddress #2 (for Multilink PPP)
AT!N41=n	Secondary Subaddress #2 (for Multilink PPP)
AT%A2=n	* Rate Adaption Control
AT%A95=c	Incoming Data Call Answer
AT%M1=n	Local Endpoint Identifier Class
AT%M2=n	Remote Endpoint Identifier Class
AT%M3=n	Local Endpoint Identifier Value
AT%M4=n	Remote Endpoint Identifier Value
AT%MT1=v	PPP Turbo Mode Command. A setting of 0 disables turbo mode, while a setting of 128000-512000 sets the turbo bitrate value. The default setting is 512000.
AT%MT2=v	PPP Turbo Mode Command. A setting between 57600 and 115200 that specifies the minimum PC bitrate threshold for the activation of turbo mode. The default is 57600.
AT&Cn	Data Carrier Detect
AT&Dn	Data Terminal Ready
AT&F	Load Limited Factory Profile; Replaces all settings in current profile with default factory values except for ISDN Switch Type, SPID numbers, local ISDN Numbers, Subaddresses, Rate Adaption Protocols, Outgoing ISDN Numbers, Multilink PPP Parameters
AT&Kn	Flow Control
AT&Sn	Data Set Ready
AT&V	View Current and Stored Profile
AT&Wn	Save Current to Stored Profile
AT&Yn	Designate Stored Profile n as the Powerup Profile
AT&Zn=v	Store Telephone Number(s)
AT@MENU	Activate VT100 Configuration Tool
AT>F	Restores All Profiles to Factory Settings
AT>FC	Replaces all Settings in the Current Profile with Default Factory Values
AT>H	Display a List of All Commands with Descriptions

AT Command	Description
AT>Hs	View Help Information for Command s
AT>VC	View Current Profile
AT>VCC	View the Call and COM Port Dynamic Parameters
AT>VCD	View All Dynamic Parameters (Call, COM, V.120, PPP, MLPPP)
AT>VCP	View the Protocol Parameters (V.120, PPP, MLPPP)
AT>VCS	View All Static Parameters (ISDN, Rate Adaption)
AT>VD	View Troubleshooting Information (including cause code)
AT>VDC	View Connection Status
AT>VDL	View Link States
AT>VPn	View Stored Profile n
AT>VT	View Stored Phone Numbers
AT>Z	Restart Netopia ISDN PC Card
ATA	Answer Calls
ATDn	Dial a Number
ATEn	Local Echo
ATH	Hang up a Call
ATIn	View Product Information
AT=n	Set Last Accessed S-Switch to n
ATO	Return Online
ATQn	Quiet Result Codes
ATS0=n	Rings to Auto-Answer
ATS1?	View Ring Count
ATS2=n	Escape Character
ATS3=n	Carriage Return Character
ATS4=n	Line Feed Character
ATS5=n	Back Space Character
ATSn	Establishes S-Register n as the Selected Register
ATSn?	Reports the Value of S-Register n
ATSn=v	Set S-Register n to Value v
AT=v	Set Last Accessed S-Register to Value v
AT?	View Last Accessed S-Register
ATVn	Result Code Format
ATWn	Connect Message Control
ATXn	Extended Result Codes
ATZn	Restarts Netopia ISDN PC Card

AT COMMAND RESULT CODES

Result codes, or status messages, are displayed after an AT command is issued. Result codes can be displayed as a long-form word message or as a short-form number code. The Result Code Format command (ATVn) determines short- or long-form usage. The following table provides the AT command result codes in both number code and word message, as well as a description:

Number Code	Word Message	Description
0	OK	Netopia ISDN PC Card has successfully executed your command
1	CONNECT	Connection was made; the range of the result code response is restricted by the X command such that no speed reporting is allowed
2	RING	Incoming ringing is detected on the line
3	NO CARRIER	Attempt to establish a connection failed; or connection ended
4	ERROR	Syntax of command incorrect; unable to execute command; command does not exist; or command parameter outside permitted range
6	NO DIAL TONE	ISDN not initialized
7	BUSY	Remote user busy
8	NO ANSWER	Remote user not responding
10	CONNECT 2400	Connection made at 2400 bps
11	CONNECT 4800	Connection made at 4800 bps
13	CONNECT 7200	Connection made at 7200 bps
14	CONNECT 12000	Connection made at 12000 bps
15	CONNECT 14400	Connection made at 14400 bps
16	CONNECT 19200	Connection made at 19200 bps
17	CONNECT 38400	Connection made at 38400 bps
18	CONNECT 57600	Connection made at 57600 bps
19	CONNECT 64000	Connection made at 64000 bps
20	CONNECT 115200	Connection made at 115200 bps
57	CARRIER 57600	ISDN line speed is 57600 bps
59	CARRIER 64000	ISDN line speed is 64000 bps
83	PROTOCOL: V.120	V.120 Rate Adaption Protocol
84	PROTOCOL: V.110	V.110 Rate Adaption Protocol
85	PROTOCOL: PPPC	PPP Protocol Conversion

Note: For all CONNECT result codes, the reported speed is the DTE speed.

Farallon Technical Support

Farallon is committed to providing its customers with reliable products and excellent technical support. Please take a moment now to fill out the registration card enclosed in your Netopia ISDN PC Card package so that we can notify you about any updated product information.

Before contacting Farallon Customer Service, please look in this user's guide for answers to your questions and possible solutions to a problem. Also, be sure to read any paper release notes or electronic "Read Me" files that you receive from Farallon.

If you contact us by telephone, please be at the site of the problem, prepared to reproduce it and to try some troubleshooting steps.

HOW TO REACH US

If you have any questions, concerns, or suggestions, please contact us by telephone, fax, or mail:

Phone: (800) 782-6449 or (510) 814-5000

Fax: (510) 814-5023

Farallon Communications, Inc.

Customer Service

2470 Mariner Square Loop

Alameda, California 94501-1010

U.S.A.

You can also contact us via the Internet:

info@farallon.com

FARALLON BBS

Farallon Bulletin Board Service: (510) 865-1321

You can also contact the Farallon Bulletin Board Service over your ISDN line. This allows you to test your ISDN connection and also download information from the BBS.

Farallon BBS ISDN line: (510) 864-5562 or (510) 864-5563

FARALLON FAX-BACK

This service provides technical notes which answer the most commonly asked questions, and offers solutions for many common problems encountered with Farallon products.

FAX-Back: (510) 814-5040 (In the U.S. and Canada only)

FARALLON INTERNET INFORMATION RESOURCES

Product information can be found on the Internet at the following addresses:

Anonymous FTP: [ftp.farallon.com/pub](ftp://ftp.farallon.com/pub)
World Wide Web: <http://www.farallon.com>

OUTSIDE OF THE UNITED STATES AND CANADA

If you are not located in the United States or Canada, you can get service locally by contacting your nearest Farallon reseller or distributor. For a worldwide list of our distributors, see our Internet information resources or contact Farallon directly.

Warranty

LIMITED WARRANTY AND LIMITATION OF REMEDIES

Farallon warrants to you, the end user, that the accompanying Farallon product, which may include third party products or technology (the "Product") will be free from defects in materials and workmanship under normal use. This warranty will expire five (5) years from date of purchase. Farallon's entire liability and your sole remedy under this warranty during the warranty period is that Farallon shall, at its option, either repair the Product or refund the original purchase price of the Product.

In order to make a claim under this warranty you must comply with the following procedure:

1. Contact Farallon Customer Service within the warranty period to obtain a Return Materials Authorization ("RMA") number.
2. Return the defective Product and proof of purchase, shipping prepaid, to Farallon with the RMA number prominently displayed on the outside of the package.

If you are located outside of the United States or Canada, please contact your dealer in order to arrange for warranty service.

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